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WOODEN AND IRON SHIPS.



VERY question of an important character requires calm, careful and candid investigation in order to arrive at correct conclusions. At the present moment the above-named subject is justly engaging much attention among our naval architects and shipping merchants.

In Europe it is already settled in favor of iron vessels, but with us it is far otherwise. As facts are the only reliable arguments that cannot be refuted, this question cannot be decided by mere assertions. On another page we publish the letter of Mr. J. W. Griffiths, the well-known naval architect, in which he makes several statements that require correction, both for his own sake and that of others (if there are any) who may have imbibed similar notions. He states that we proposed, on page 131, present volume of the SCIENTIFIC AMERICAN, to "enlighten our readers on the subject of naval architecture;" that we "are in favor of iron vessels and give them the preference over wood;" that the eminent shipbuilder, whose opinions we quoted on page 180, in regard to iron ships "has an object in view beyond his country's good;" and that "either ignorance or avarice forms the basis of all projects for substituting iron for wood in the outer shell of our ships."

We are surprised that Mr. Griffiths should make such charges against those who differ from him in opinion, more especially as they are totally devoid of reliability. We never proposed to enlighten our readers on the subject of naval architecture. It was stated on page 131 that it would afford us much pleasure to receive communications on the subject from practical shipbuilders; that is all. The eminent shipbuilder against whose opinions ignorance, avarice and self-interest are insinuated, is altogether interested in building timber vessels; he is a man of reflection, long experience, and has had great opportunities of observation. We have no preferences for iron over wooden vessels; such a term is entirely misapplied to us. We examine facts, arrange and compare them, and upon these we express opinions. This we have done on this question, with impartiality, for we have neither had professional prejudices nor personal mercantile interests to warp our judgment in the investigation. We do not pretend to infallibility, but the facts which we have presented have never been refuted; and Mr. Griffiths himself has come round to such opinions, in all but the outer shell of ships, while Donald McKay has come wholly up to the iron standard. Let us give us a brief review of the question as it was and as it now stands.

Three years ago we directed attention to the great increase of foreign screw steamers, on page 285, Vol. XII. (old series) of the SCIENTIFIC AMERICAN, and showed clearly how they were rapidly taking away the trade that had been formerly carried on by American ships. From opinions expressed by such authorities as Mr. Griffiths, we then stated that as wooden screw steamers could be built as cheaply here as those of iron in England, our merchants should endeavor to regain their lost trade by building such. We said: "The longer they delay, the weaker and less able will they become for the struggle, while their rivals will be growing stronger and stronger, and increasing in wealth, power and influence." Our merchants did not heed this injunction, and, as a consequence, their rivals have grown stronger, while they have become weaker. Twenty-five years ago the whole Atlantic mail and passenger, and most of the goods traffic, was carried on in American bottoms; to-day nearly

all the mail and passenger, besides a great deal of the goods traffic, is carried by foreign ships, the great majority of which are iron screw steamers. These facts are indisputable; how can we account for them but upon the theory that iron screw steamers—all things considered—are the cheapest and best for such traffic? By careful inquiry, backed up by many new facts, we expressed such an opinion (not a preference, as Mr. Griffiths calls it) on page 305 of our last volume. We said: "This is no time for boasting of what we have done or what we can do, but of speaking by deeds. We have lost and are still losing our carrying trade, from the competition of a class of steamers the efficiency and economy of which our people do not yet appreciate—iron screw steamers." A short time after these opinions were published, a letter appeared in the Boston *Traveler* from Donald McKay, then in Europe, in which he said that iron and steel "as materials for shipbuilding had proved more economical than timber in the long run, and it is high time that our shipbuilding merchants turned their attention to the subject." This was a remarkable coincidence of opinion, in support of the one we had expressed. We exhort our shipping merchants to examine the question candidly for themselves and not be guided by any man's opinion; let them take facts, and not assertions, as the basis of their operations, for we assure them that while some of our nautical architects are indulging in vain disquisitions, "the Philistines are upon them." We have not a single new Atlantic steamship on the stocks, from one end of the country to the other; while in Great Britain there are 16,000 tons of new iron screw steamers building for the American trade. These are ugly but indisputable facts to which our shipping merchants would do well to take heed in due season.

THE LEATHER-DEALERS AND THE LYNN STRIKERS.

It would seem that for muddling the mind there is nothing like leather. The utter ignorance of the forces which regulate the wages of labor and the general distribution of wealth, displayed by the shoemakers of Massachusetts in their strike, has received a countenance and parallel from a very unexpected quarter. It is known that the notes of the leather-dealers in this city rank A 1 in the money market. This is the class of men who do not fail. They are the solid men of New York. But it seems that in their comprehensions of the nature of wealth, and of the influence of its production upon its distribution and accumulation, they are just as foolish as the shoemakers of Natick. They have just issued a circular the object of which is to persuade the tanners of the country that these manufacturers would make more money by suspending a portion of their works. To advise the shoemakers to purchase and read "Wayland's Political Economy," would doubtless be breath or ink thrown away, but it would seem that the gentlemen who ride down leisurely from their brown stone houses at 10 o'clock in the morning, and fill the earliest omnibuses in the afternoon, might find time for the task, for it is not a large volume.

Wealth does not consist of gold and silver only, but of all articles of merchandise in the community. It is being constantly produced and constantly consumed. The more there is produced in the community the more is there to divide between the capitalist and the laborer. When ready-made clothing, food and all other objects of human desire are rained down spontaneously from the skies, then may the laborer improve his condition by ceasing to work, and the manufacturer grow rich by suspending his operations. But in the present order of things, there is but one way for classes or communities to accumulate wealth, and that is by producing more of it than they consume; in other words, by industry and economy.

ACTIVITY AND INDUSTRY OF INVENTORS.

The list of claims furnished us by the Patent Office, and published weekly in our columns, shows the progress of inventions in this country, without requiring any statistics to convince our readers, at home and abroad, that the inventors of our land are not asleep or inactive. There never has been a time when more industry was manifested by inventors than the present; and we have never known of so many sales of patents, at remunerative prices, as we have lately. The claims on another page indicate that one hundred and five patents were issued for the week ending March 20th. In looking over

this list, we are happy to recognize the names of many of our own patrons among the number. Forty-one of the patentees whose names appear in this week's list had their papers prepared at, and their applications conducted to a successful termination through, the Scientific American Patent Agency. We presume we are safe in asserting that there were never before so many Letters Patent issued to the clients of a single agency in this or any foreign country in one week, and some of them are on very valuable inventions, and will be the means of promoting their owners in some cases from poverty to a competence, perhaps to affluence, if judicious means for introducing their inventions to the public be brought into requisition.

WORKING STEAM EXPANSIVELY.

The practical application of high pressure steam as a mechanical force, and the economical generation of it, are items of no small interest to the manufacturing community at large; and the immediate object of this article is a few remarks upon the existing state of affairs in this city as regards its use and control. As a general principle, high pressure engines obtain a much greater degree of popularity than low pressure, and the reason may be found in a variety of causes, the chief of which are a lessened first cost, greater simplicity of construction, and others which are not necessary to speak of; therefore our observation is confined solely to them. We find that in by far the greater part of the places where steam power is used, the principle of expansion, if practiced at all, is but very imperfectly so; the steam follows the piston during the whole stroke and seems to escape, with but very slight breaks, in a continuous stream at the exhaust, without stopping long enough in the cylinders to produce the proper effect economically and well. As a natural consequence these engines do not perform regularly or run with that ease and freedom with which they should; while the steam, instead of working expansively and putting out its full force, merely impels the engine around from the actual pressure accumulated in the boiler.

Aside from the matter of injury which it is alleged high pressure steam is the cause of, to the valves and chests (and which is a matter of great doubt), from the very nature of its uncontrollable elasticity it is the most powerful motor, practical in every-day use, which is known; but to exert this power and this force, it must be legitimately and properly used. It is not so used, nor does it fulfill its true purpose when it follows the piston all the way. What is the use of a complex mechanical apparatus to regulate the force of the steam to the cylinder, if the cylinder itself is so small as to demand that the valves be opened to their fullest extent the whole day long? Under such a state of things it is but a nuisance and a stumbling block, and much better off the engine than on it. It is to the general ignorance of the manufacturers and their unwillingness to go to any expense (though they may reap the reward in a few years, at most, in the saving of fuel, of their outlay), that these matters are to be traced. It is unquestionably better to use steam expansively at 55 or 60 lbs. per square inch, at which point its elasticity and temperature are great enough for any ordinary mechanical purpose, than at a much greater pressure, non-expansively. Dr. Lardner says of expansion:—"Since the cost of producing steam as a mechanical force depends chiefly on the quantity of fuel necessary to effect the evaporation of a given quantity of water in a given time, it follows, therefore, that all the mechanical effect produced by this principle of expansion is so much power added to the steam without additional expense." Its principle is therefore obvious enough in economy of steam power. To produce the greatest mechanical effect, which forms by far the largest portion of expense required to operate steam power, many things are important, but the chief of them are in the prevention of heat from escaping from the steam during its passage from the boiler to the engine, and in employing "cut-offs," as they are termed, to operate the steam expansively; there are many of these in operation, of different forms and principles, but a great many are thrown aside and condemned simply from the fact of the pistons not having sufficient area to develop the principle properly and well; and it is a matter well worthy the attention of those applying such apparatus, that they consider most carefully whether the initial diameter of the cylinder is such as to make their inventions thorough and efficient, for, as has been mentioned, many have